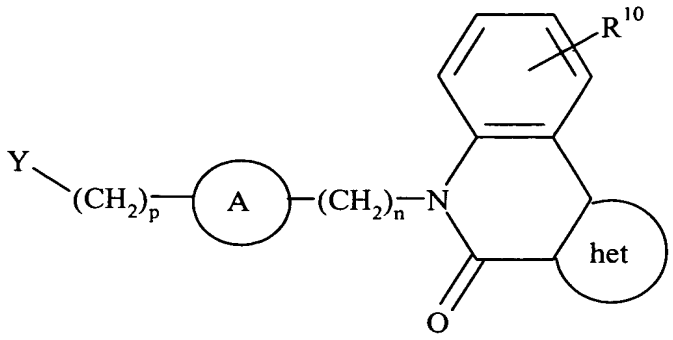
Listing of Claims

1. (currently amended) A compound of formula I:



I

where:

A is a C_3-C_8 cycloalkyl, optionally substituted 1-3 times with a C_1-C_4 alkyl;

het is a five (5) membered heterocyclic ring comprising N and a second heteroatom selected from N, ~~O,~~ or S;

wherein the non-fused carbon atom of the ~~heteroaryl~~ heterocyclic ring may be optionally substituted with R^{b}, wherein R^{b} is C_1-C_6 alkyl, optionally substituted aryl, optionally substituted heterocycle, an amino acid ester, CH_2OH, CH_2O-heterocycle, halo, CH_2N_3, CH_2SR^1, $CH_2NR^4R^6$, OR^1, SR^{13}, $S(CH_2)_k$-phenyl, or NR^4R^6; provided that when het is pyrazole or imidazole, the saturated nitrogen of the het ring may be optionally substituted with R^{a}, wherein R^{a} is C_1-C_4 alkyl;

k is 0, 1, 2, 3, or 4;

n is 0, 1, or 2;

p is 0 or 1;

q is 0, 1, or 2;

r is 0, 1, or 2;

t is 0, 1, 2, 3, or 4;

u is 0, 1, 2, 3, or 4;

Y is –E-C(O)R^3, -E-CH=CHR^{13}, -E-C(OH)R^{13}, -E-NR^4R^5, -E-OR^2, -E-S(O)$_q$$R^{13}$, -E-$SO_2NR^4R^6$, -C($R^{11}$)=N$R^6$, or an optionally substituted heterocycle;

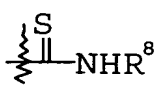
E is a bond or -C(R^{11})(R^{11})-;

R^1 is independently at each occurrence hydrogen or C_1-C_6 alkyl;

R^2 is independently at each occurrence hydrogen, C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted heterocycle, C(O)-aryl, C(O)N-phenyl, or $(CH_2)_2NR^4R^5$;

R^3 is independently at each occurrence hydrogen, C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted heterocycle, OR^{13}, or NR^4R^6;

R^4 is independently at each occurrence hydrogen, C_1-C_6 alkyl, optionally substituted (C_1-C_6 alkyl)-aryl, SO_2CH_3, or optionally substituted aryl; or ~~R^4 and~~ R^5, R^6, or $R^{6'}$ combine with R^4 to form =CR^1R^{14};

R^5 is independently at each occurrence hydrogen, C_1-C_6 alkyl, C_1-C_4 alkoxy, optionally substituted heterocycle, optionally substituted C_3-C_8 cycloalkyl, optionally substituted C_6-C_{10} bicycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, C(O)C(O)R^{13}, C(O)R^7, CH_2R^7, SO_2R^8, or a moiety of the formula  ; or R^4 and R^5, together with the nitrogen to which they are attached, combine to form an optionally substituted N-heterocycle;

R^6 is independently at each occurrence hydrogen, C_1-C_6 alkyl, C_1-C_4 alkoxy, optionally substituted C_3-C_8 cycloalkyl, optionally substituted C_6-C_{10} bicycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, or optionally substituted heterocycle; or R^4 and R^6, together with the nitrogen to which they are attached, combine to form an optionally substituted N-heterocycle;

$R^{6'}$ is independently at each occurrence hydrogen, C_1-C_6 alkyl, C_1-C_4 alkoxy, optionally substituted C_3-C_8 cycloalkyl, optionally substituted C_6-C_{10} bicycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, optionally substituted heterocycle, (C_1-C_4 alkyl)-OR^{13}:

wherein the (C_1-C_4 alkyl) of the (C_1-C_4 alkyl)-OR^{13} may be optionally substituted from 1 to 2 times with C_1-C_4 alkyl, optionally substituted aryl, or optionally substituted heterocycle;

or R^4 and $R^{6'}$, together with the nitrogen to which they are attached, combine to form an optionally substituted N-heterocycle;

R^7 is independently at each occurrence optionally substituted C_1-C_6 alkyl, C_1-C_6 alkoxy, (C_1-C_4 alkoxy)-aryl, (C_1-C_4 alkoxy)-heterocycle, (C_1-C_4 alkoxy)-$Si(CH_3)_3$, optionally substituted (C_3-C_8 cycloalkyl), optionally substituted (C_1-C_4 alkyl)-(C_3-C_8 cycloalkyl), optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, diphenylmethyl, optionally substituted (C_1-C_4 alkyl)-CO-aryl, optionally substituted CO-aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, 3-oxo-indanyl, fluoren-9-yl substituted with hydroxy, optionally substituted CH=CH-heterocycle, optionally substituted phenoxy, optionally substituted heterocycle, optionally substituted (C_1-C_4 alkyl)-phenoxy, $(CH_2)_tS(O)_rR^1$, $(CH_2)_tC(R^{12})(R^9)N(R^{16})(R^{15})$, $(CH_2)_tC(R^{12})(R^9)O(R^{17})$, $(CH_2)_tC(R^{12})(R^9)S(R^{17})$, or $NR^4R^{6'}$;

R^8 is independently at each occurrence optionally substituted C_1-C_6 alkyl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, or optionally substituted heterocycle;

R^9 is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted heterocycle, $(CH_2)_u$–(C_1-C_6 alkoxy), optionally substituted $(CH_2)_u$-O-(C_3-C_8 cycloalkyl), optionally substituted $(CH_2)_u$-(C_1-C_4 alkoxy)-aryl, optionally substituted $(CH_2)_u$-O-aryl, optionally substituted $(CH_2)_u$-O-heterocycle, (C_1-C_4 alkyl)-CO_2-(C_1-C_6 alkyl), optionally substituted (C_1-C_4 alkyl)-CO_2-(C_3-C_8 cycloalkyl), optionally substituted (C_1-C_4 alkyl)-CO_2-(C_1-C_4 alkyl)-aryl, optionally substituted (C_1-C_4 alkyl)-CO_2-aryl, or optionally substituted (C_1-C_4 alkyl)-CO_2-heterocycle; or R^9 and R^{12} combine to form a C_3-C_8 cycloalkyl;

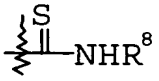
R^{10} is 0 to 4 substituents from the aryl ring independently at each occurrence hydrogen, halo, $C(O)R^3$, cyano, optionally substituted heterocycle, optionally substituted aryl, $C\equiv C\text{-}R^1$, C_1-C_4 alkoxy, (C_1-C_4 alkyl)-phenyl, $NR^{19}R^{20}$, $\underline{CH_2OH}$, $\underline{CO_2CH_2CO_2CH_2CH_3}$, or C_2-C_6 alkenyl;

R^{11} is independently at each occurrence hydrogen, C_1-C_6 alkyl, optionally substituted heterocycle, optionally substituted (C_1-C_4 alkyl)-heterocycle, optionally substituted aryl, or optionally substituted (C_1-C_4 alkyl)-aryl;

R^{12} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle or optionally substituted heterocycle;

R^{13} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, methoxy, hydroxy, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, $CO_2CH_2CO_2CH_2CH_3$, or optionally substituted heterocycle;

R^{14} is independently at each occurrence C_1-C_6 alkyl or optionally substituted (C_1-C_4 alkyl)-aryl;

R^{15} is independently at each occurrence hydrogen, C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted C_6-C_{10} bicycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted (C_1-C_4 alkyl)-heterocycle, optionally substituted heterocycle, $C(O)OR^{13}$, SO_2R^8, $C(O)R^{18}$, or a moiety of the formula  ;

R^{16} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, optionally substituted aryl, optionally substituted heterocycle, SO_2CH_3 or $-COR^8$; or R^{16} and R^{15}, together with the nitrogen to which they are attached, combine to form an optionally substituted N-heterocycle;

R^{17} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, COR^{18}, optionally substituted heterocycle, optionally substituted (C_1-C_4 alkyl)-heterocycle, optionally substituted C_1-C_6 alkoxy, optionally substituted (C_1-C_4 alkoxy)-aryl, optionally substituted (C_1-C_4 alkoxy)-heterocycle, (C_1-C_4 alkyl)-$N(R^1)(R^1)$, or an amino acid ester;

R^{18} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted (C_1-C_4 alkyl)-aryl, optionally substituted aryl, optionally substituted heterocycle, (C_1-C_4 alkyl)-$NHCO_2$-(C_1-C_4 alkyl), or optionally substituted (C_1-C_4 alkyl)-heterocycle;

R^{19} is independently at each occurrence hydrogen, CO-(C_1-C_4 alkyl), or optionally substituted C_1-C_6 alkyl;

R^{20} is independently at each occurrence hydrogen, optionally substituted C_1-C_6 alkyl, CH_2OH, or CO-(C_1-C_4 alkyl);

or a pharmaceutical salt thereof;

wherein:

optionally substituted C_1-C_4 alkyl and optionally substituted C_1-C_6 alkyl refers to a C_1-C_4 alkyl or C_1-C_6 alkyl, respectively, unsubstituted or substituted from 1 to 3 times with halo, C_1-C_4 alkanol, NH_2, or hydroxy;

optionally substituted C_3-C_8 cycloalkyl refers to a C_3-C_8 cycloalkyl unsubstituted or substituted once with a phenyl, substituted phenyl, hydroxy, or CO_2R^1 group;

optionally substituted (C_1-C_4 alkyl)-(C_3-C_8 cycloalkyl) refers to optionally substituted C_3-C_8 cycloalkyl linked through an optionally substituted C_1-C_4 alkyl;

optionally substituted O-(C_3-C_8 cycloalkyl) refers to an optionally substituted C_3-C_8 cycloalkyl linked through an oxygen atom;

optionally substituted C_6-C_{10} bicycloalkyl refers to a C_6-C_{10} bicycloalkyl unsubstituted or substituted once with a phenyl, substituted phenyl, or CO_2R^1 group;

optionally substituted aryl refers to a phenyl and naphthyl group, respectively, unsubstituted or substituted from 1 to 5 times independently with C_1-C_6 alkyl, halo, hydroxy, trifluoromethyl, phenyl, phenoxy, SO_2R^1, OR^{11}; NR^4R^5, $SO_2N(R^{13})_2$, NH-Pg, C_1-C_6 alkoxy, benzyloxy, $C(O)R^{13}$, C_5-C_7 cycloalkyl, trifluoromethoxy, SR^1, cyano, or nitro;

optionally substituted (C_1-C_4 alkyl)-aryl refers to optionally substituted aryl linked through an optionally substituted C_1-C_4 alkyl;

optionally substituted O-aryl refers to an optionally substituted aryl linked through an oxygen atom;

optionally substituted phenoxy refers to a phenoxy group unsubstituted or substituted from 1 to 3 times independently with C_1-C_6 alkyl, halo, hydroxy, trifluoromethyl, NR^4R^6, $SO_2N(R^{13})_2$, NH-Pg, C_1-C_6 alkoxy, benzyloxy, $C(O)R^{13}$, C_5-C_7 cycloalkyl, trifluoromethoxy, cyano, or nitro;

optionally substituted (C_1-C_4 alkyl)-phenoxy refers to unsubstituted or substituted phenoxy linked through an optionally substituted C_1-C_4 alkyl;

heterocycle is taken to mean stable unsaturated and saturated 3 to 6 membered rings containing from 1 to 4 heteroatoms selected from the group consisting of nitrogen, oxygen and sulfur, said rings being optionally benzofused. All of these rings may be substituted with up to three substituents independently selected from the group consisting of halo, C_1-C_4 alkoxy, C_1-C_4 alkyl, cyano, nitro, hydroxy, -$S(O)_m$-(C_1-C_4 alkyl) and -$S(O)_m$-phenyl where m is 0, 1 or 2;

optionally substituted heterocycle refers to a heterocyclic ring unsubstituted or substituted 1 or 3 times independently with a C_1-C_6 alkyl, halo, benzyl, optionally substituted phenyl, SR^1, C_1-C_4 alkoxy, CO_2R^1, nitro, cyano, (C_1-C_4 alkyl)-cyano, heterocycle, $NR^{19}R^{20}$, COR^{12}, C_1-C_6 alkanol, benzyloxy, phenoxy, trifluoromethyl. Heterocyclic rings may be additionally substituted 1 or 2 times with an oxo group;

optionally substituted O-heterocycle refers to an optionally substituted heterocycle linked through an oxygen atom;

optionally substituted (C_1-C_4 alkyl)-heterocycle refers to optionally substituted heterocycle linked through an optionally substituted C_1-C_4 alkyl;

N-heterocycle refers to a nitrogen containing heterocycle linked through a nitrogen atom; and

optionally substituted N-heterocycle refers to a N-heterocycle, optionally substituted 1 or 3 times independently with a C_1-C_6 alkyl, halo, benzyl, optionally substituted phenyl, SR^1, C_1-C_4 alkoxy, CO_2R^1, nitro, cyano, (C_1-C_4 alkyl)-cyano, heterocycle, $NR^{19}R^{20}$, COR^{12}, C_1-C_6 alkanol, benzyloxy, phenoxy, trifluoromethyl; and additionally substituted 1 or 2 times with an oxo group.

Claims 2-3 (canceled)

Claim 4. (currently amended) The compound of ~~any one of Claims 1-3~~ Claim 1 where A is 1,3-cyclohexyl.

Claims 5-18 (canceled)

Claim 19. (original) A method of inhibiting MRP1 in a mammal which comprises administering to a mammal in need thereof an amount effective to inhibit MRP1 of a compound of formula I, as defined in Claim 1, or a pharmaceutical salt thereof.

Claims 20-58 (canceled)

Claim 59. (original) A pharmaceutical formulation comprising a compound of formula I, as defined in Claim 1, or a pharmaceutical salt thereof; in combination with one or more pharmaceutical carriers, diluents, or excipients therefor.

Claims 60-65 (canceled)

Claim 66. (original) A pharmaceutical composition for inhibiting MRP1 in a mammal which comprises an effective amount of a compound of formula I, as defined in Claim 1, or a pharmaceutical salt thereof.

Claims 67-71 (canceled)

72. (new) The compound of Claim 1 which is (3-[[5-(2-Chloro-6-fluoro-phenyl)-3-methyl-3H-imidazole-4-carbonyl]-amino]-cyclohexylmethyl)-carbamic acid benzyl ester.

73. (new) The compound of Claim 1 which is (3-(9-Chloro-3-methyl-4-oxo-3,4-dihydro-imidazole-[4,5-c]-quinolin-5-yl)-cyclohexylmethyl)-benzamide.

74. (new) The compound of Claim 1 which is (3-(9-Chloro-3-methyl-4-oxo-3,4-dihydro-imidazole-[4,5-c]-quinolin-5-yl)-cyclohexylmethyl)-carbamic acid benzyl ester.

75. (new) The compound of Claim 1 which is N-[3-(9-Chloro-3-methyl-4-oxo-2,4-dihydropyrazolo[4,3-c]quinolin-5-yl)-cyclohexylmethyl]benzamide.

76. (new) The compound of Claim 1 which is N-[3-(9-Chloro-3-methyl-4-oxo-2,4-dihydropyrazolo[4,3-c]quinolin-5-yl)-cyclohexylmethyl]-6-fluoronicotinamide

77. (new) The compound of Claim 1 which is N-[3-(4,10-Dichloro-5-oxo-5H-benzo[h] [1,6]naphthyridin-6-yl)-cyclohexylmethyl]-benzamide.

78. (new) The compound of Claim 1 which is N-[3-(10-Chloro-4-methoxy-5-oxo-5H-benzo[h] [1,6]naphthyridin-6-yl)-cyclohexylmethyl]-benzamide.

79. (new) The compound of Claim 1 which is N-[3-(10-Chloro.-4-methylamino-5-oxo-5H-benzo[h] [1,6]naphthyridin-6-yl)-cyclohexylmethyl]-benzamide.